



RECORD BATS USING YOUR PHONE! SAMPLING PROTOCOL

Follow these instructions to record bats flying around you using your smartphone or tablet. Depending on whether you have an iOS or Android device, you will be able to record continuously or in automatic mode, respectively. Indeed, the choice of app you use is contingent upon your device's operating system.



Instructions for iOS users

Before starting


Make sure you have the Voice Memos app installed on your device; otherwise, you can download it through the following link:


<https://apps.apple.com/us/app/voice-memos/id1069512134>

App settings

In device **Settings** > **Voice Memos**, set Audio quality to "Lossless".

Sampling session

To start sampling, open Voice Memos app and press the recording button .

To conclude the sampling session and save the recording, press the stop button .




Instructions for Android users

Before starting

Download and install Bat Recorder app through the following link:

<https://play.google.com/store/apps/details?id=com.digitalbiology.audio&hl=it&gl=US>

App settings

Open Bat Recorder app and press "Continue". Then press the Settings button  on the bottom right of the screen, and set as follows:

– Analysis

- FFT window size: **1024**
- Microphone sampling rate (not modifiable): **48.0 kHz**
- Maximum recording length: **10 secs**
- Continuous recording
- Logarithmic frequency scale
- Show frequency grid lines
- Only display triggered events
- Live spectrogram display: **refresh**
- Expansion factor: **10x**
- Enable all playback modes for non-ultrasonic signals
- Heterodyne frequency range: **1 - 200 kHz**

– Recording

- Toggle recording by shaking
- Trigger frequency range: **8 - 200 kHz**

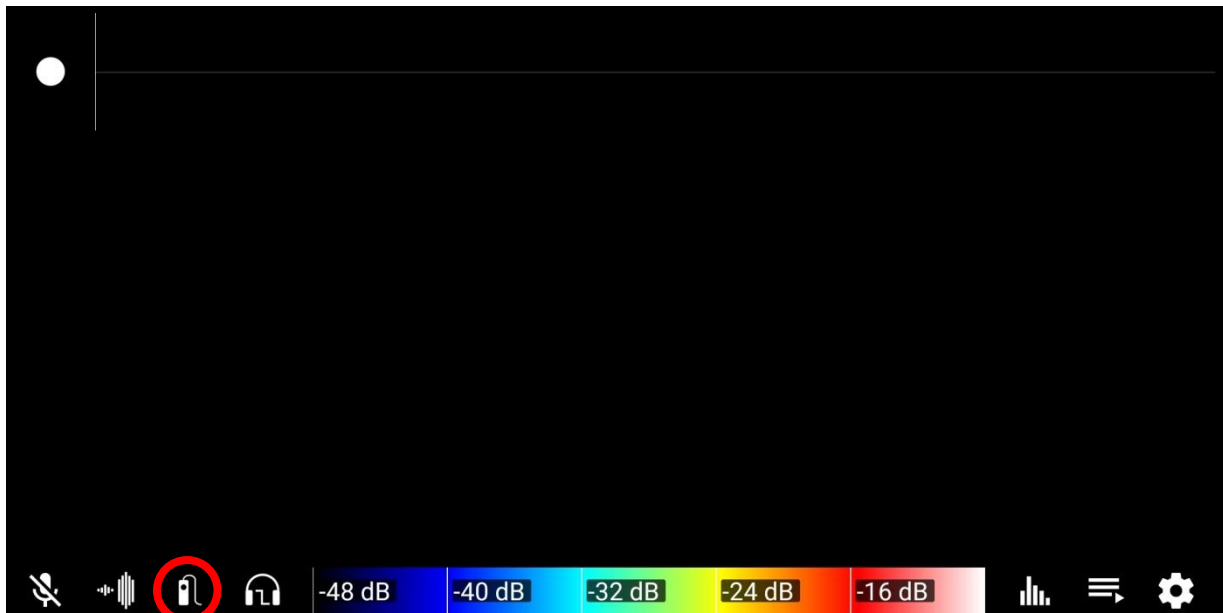



- Trigger intensity threshold: **-40 dB**
- Post trigger: **3 secs**
- Pre trigger: **1 sec**
- Listening buffer length: **10 secs**
- Trigger using volume buttons
- **Listening timer**
 - Listening Duration: **2 minutes**
 - Sleep Interval: **10 minutes**
- **Geolocation**
 - Geotag WAV files
 - GPS Update frequency: **2 minutes**
 - GPS Update minimum distance: **10 meters**
- **General**
 - Night mode
 - Metadata format: **GUANO**
 - Language localization: **default**
 - Always show Android system bars
 - USB debug log

Close the app, changes have been saved.

Sampling session

To start sampling, open Bat Recorder app and press “Continue”. You will see the following screen:



Click once on the first button at the bottom left (microphone symbol 

Click once on the third button from the left (remote control symbol with cable, circled in red in the image). From now on, monitoring has begun: the automatic recording mode is active, i.e., recordings of a few seconds will be made whenever noises are perceived.



Guidelines for a correct sampling

Place your device in a place at least 2 m away from the ground, walls or other objects, which can cause echoes which can spoil the quality of the recordings. A balcony railing or a garden roof are fine. Place the device with the microphone facing the most open area. Start the sampling session at or shortly after sunset and return to retrieve the device after 3-4 hours. For Android devices, it is not a problem if the device turns off because it runs out of battery, all recordings made up to that moment have been saved. However, for iOS devices, a single long recording will be produced. Therefore, it is important to be mindful of battery levels to avoid any interruptions.

Keeping recording apps running continuously will drain the device's battery pretty fast. Therefore, when starting the sampling session, make sure that the battery is fully charged and that you apply some useful precautions to preserve battery life, such as:

- Switch to silent mode;
- Turn off Wi-Fi, data connection, Bluetooth, GPS;
- Activate the flight mode;
- Minimise brightness;
- Enable power-saving mode;
- If necessary, you can keep the device connected to a power bank or a charger.

Try to carry out 3 or 4 sampling sessions (i.e., 3 or 4 evenings), to collect sufficient data. Sampling sessions do not necessarily have to be carried out on consecutive days. Do not monitor in rain or strong winds.

For Android users: the recordings made in each sampling session will be automatically saved in a dedicated folder (bearing the date on which the monitoring was carried out) in the device's internal memory, at the path: **Phone > BatRecorder**.

Sending data

Recordings can be sent via WeTransfer to the following email address: **batrecordings@gmail.com**

In the "Message" box, please specify:

- Your name;
- Your device model;
- The address or coordinates of the sampling site.

<https://wetransfer.com/>

Thank you for choosing to collaborate on this project,

Happy batting!